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PUBLIC HEALTH LABORATORY SERVICE

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THE PUBLIC HEALTH LABORATORY SERVICE BOARD

(1963)

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Mrs. J. Taylor, M.B., B.Sc., D.P.H.

INTRODUCTION

ADMINISTRATION AND ORGANISATION OF THE SERVICE

The Public Health Laboratory Service is the successor of the Emergency Public Health Laboratory Service planned, organised and administered during the war years 1939–1945 by the Medical Research Council, at the request of H.M. Government. In 1945 it was decided by the Government to retain the Service on a permanent footing. Statutory authority was provided by Section 17 of the National Health Service Act, 1946, which empowered the Minister of Health to provide a " bacteriological service " for the control of the spread of infectious diseases. Later the Medical Research Council agreed to an extension of the period of their administration, with the delegation of detailed responsibility to the Public Health Laboratory Service Board appointed by them for this purpose. In 1960, however, the Public Health Laboratory Service Act, 1960, established and incorporated a new Public Health Laboratory Service Board as a statutory body capable of acting in its own right as agent for the Minister. The Act also provided for the transfer of staff of the Service from the employment of the Council to that of the Board, and the transfer of property from the Council to the Minister of Health; these transfers took effect on 1st August, 1961.

The Chairman and members of the Public Health Laboratory Service Board are appointed by the Minister of Health and, in accordance with the Schedule to the Act, the members must include the following (and must therefore be at least eight in number, in addition to the Chairman):

(*a*) not less than two persons appointed after consultation with the Medical Research Council;

(*b*) not less than two persons with experience as bacteriologists, appointed after consultation with such organisations as the Minister thinks appropriate;

(*c*) not less than two persons holding office as medical officer of health to a local authority;

(*d*) not less than one person appointed after consultation with such organisations as appear to the Minister to represent the hospital service;

(*e*) not less than one fully registered medical practitioner engaged in general medical practice, appointed after consultation with such organisations as the Minister may recognise as representative of practitioners so engaged.

The Chairman and members of the Board are normally appointed for a term of three years.

The Board exercises its functions in accordance with any directions received from the Minister of Health. In the exercise of these functions it acts as a principal.

The staff of the laboratories of the Service are appointed and employed by the Board. The scientific staff are selected almost entirely from newly qualified medical graduates after they have held house appointments for 6 to 12 months;

they then receive 5 years' training in pathology and bacteriology. During the third year the trainee is required to obtain the Diploma of Bacteriology of the University of London or the University of Manchester. As a general rule, science graduates without medical qualifications are employed only in the reference laboratories, where the work is of a highly specialised nature. The technical staff is recruited from boys and girls leaving school at 16 to 17 years of age, who have reached the necessary standard of education; they go through a 5-year apprentice system of training.

The development of the Service between 1948—in which year it was established in its present form—and 1962 may be summarised as follows:

	1948	1950	1955	1962
Number of Constituent Laboratories	36	44	56	59
Medical staff	84	107	124	132
Scientific staff		27	26	39
Technical, clerical and maintenance staff.. ..	562	721	778	956
Total specimens examined ..	793,314	1,180,621	1,689,033	2,314,126

At first the material received at the laboratories consisted of sanitary specimens—milks, water, foodstuffs, etc.—and specimens of human and animal origin sent in for bacteriological examination. In 1956, however, after a field trial of the Salk poliomyelitis vaccine carried out with the help of the laboratories of the Service under the aegis of the Medical Research Council, attention was increasingly directed to the examination of specimens for virus infection. By 1958 the majority of the laboratories were able to offer the virus diagnostic service which is now general. In 1962 63,465 virus specimens were examined.

In the early post-war years most of the constituent laboratories were housed in temporary accommodation provided by County Councils, County Borough Councils, University departments and hospitals; a few were in huts or converted houses. However, a programme was soon established for the provision of permanent buildings, designed for their purpose, and sited conveniently for the areas served. It was decided by the Ministry of Health in 1946 that, whenever possible, public health laboratories should in future be situated in hospital compounds, as the need for the integration in the Service of public health and hospital bacteriology became generally recognised. After the Regional Hospital Boards had come into operation, this led to the establishment of joint public health and hospital laboratories. At the present time nearly all major projects for new buildings are of this nature, and the building programme is linked to that of the Ministry of Health for new hospitals.

New public health laboratory buildings or extensive adaptation of old accommodation to house existing units of the Service have been completed at the following places: Oxford (1945); Colindale (Central Public Health Laboratory), Conway, Winchester (1946); Leicester, Sheffield, Worcester (1948); Ipswich, Nottingham (1949); Cambridge, Lincoln, Portsmouth (1950); Bedford, Bournemouth, Brighton, Northallerton, Reading, (1951); Bath, Colindale (new extension block), Northampton, Taunton (1952); Guildford, Salisbury (1953); Norwich, Luton (1954); Leeds (1955); Chelmsford, Newcastle upon Tyne, Swansea (1956); Newport (1957); Derby, Preston (1958); Maidstone (1959); Chester (1960); Glangwili (Carmarthenshire) (1961); Southampton (1963).

Further new laboratory buildings are planned for construction in the near future at Bristol, Exeter, Fazakerley, Hull, Manchester, Peterborough and Poole. All are joint projects at hospitals and, as in the case of the previous new buildings, they do not represent additional establishments of the Service, but will re-house existing ones.

Laboratory extensions are in progress at Bath, Coventry, Dorchester, Epsom, Leeds, Lincoln, London (County Hall), and Oxford.

The Central Laboratory of the Service is situated at Colindale, London, N.W.9, and contains not only a routine Public Health Laboratory serving the adjacent area of Middlesex, but also a number of reference laboratories and specialist departments. There are three small sub-laboratories at Coppett's Wood, Edmonton and Neasden receiving routine public health work from their areas.

There is a separate laboratory at County Hall, London, S.E.1, serving the County of London.

For the remainder of England and Wales there are 57 constituent laboratories and 6 " recognised " ones. These latter are hospital pathological laboratories which undertake the examination of sanitary specimens for the Service in areas where the facilities of a constituent laboratory are not available, or are available only at a long distance with considerable inconvenience.

The total of 59 constituent laboratories includes the following 9 regional ones: Bristol, Cambridge, Cardiff, Leeds, Liverpool, Manchester, Newcastle upon Tyne, Oxford and Sheffield. These regional laboratories, most of which are staffed by three to five medically qualified workers, together with junior bacteriologists in course of training, act to some extent as parent laboratories to a group of area laboratories. Help is provided in the handling of special—e.g. epidemiological—enquiries, and in the provision of staff substitutes during periods of leave or illness.

SCOPE OF THE SERVICE

The routine work of the Service is essentially bacteriological, virological and epidemiological. Apart from certain tests closely associated with bacteriological and virological investigations, chemical and biochemical tests and histological examinations are not performed. Except by special arrangement the Service does not undertake work that is rightly within the province of the hospital or clinical pathologist, but it is ready to offer help when facilities for such work are not otherwise available.

All specimens must be submitted by doctors, veterinarians, dentists, public health inspectors, and others acting on behalf of medical officers of health, Government departments, or representatives of other official bodies; specimens cannot be accepted from private persons.

The routine specimens fall under two main heads:

(*a*) " Medical " specimens received from medical practitioners, infectious diseases hospitals and local authorities. These are specimens of sputum, faeces, throat swabs, blood samples, etc., taken for diagnostic examination from persons suspected of suffering from infectious disease. General practitioners, medical officers of health, school medical officers and others are offered a comprehensive service for the diagnosis, treatment and prevention of bacterial, virological and mycological infections. Medical practitioners are welcomed at all times in the laboratories for the purpose of consultation.

(*b*) " Sanitary " specimens: these are received from medical officers of health, public health inspectors, and others concerned officially with the control of the public health. They comprise specimens for bacteriological examination of water, shell-fish, watercress, sewage, milk and cream; of processed foods such as ice-cream, artificial cream and canned foods; and of imported products such as the various forms of meat, fish, processed egg, coconut and fertiliser. The Service normally examines only material offered to the consumer, but will, of course, examine specimens taken at any stage of production or distribution by medical officers of health investigating suspected food-borne infections. The Service is ready to give free advice to food manufacturers and processors to assist them in the production and distribution of bacteriologically safe products. For routine control of such products, commercial firms are charged a fee, but work of this sort is undertaken only exceptionally.

Brief mention has already been made of the reference laboratories and specialist departments. These provide facilities for the exact identification and " finger-printing " of organisms belonging to many different groups. This is sometimes required by clinicians in their treatment of patients, but more often for epidemiological purposes. The reference laboratories are open freely for use by any laboratory within or without the Service. In addition, a number of reference experts are retained for the examination of occasional specimens which require special skill, special knowledge, or special reagents.

The epidemiological work of the Service includes not only the investigation of outbreaks of infectious disease, in co-operation with local medical officers of health, but also a study of the distribution and behaviour of infectious agents throughout England and Wales. Epidemiological information is collected centrally week by week from public health and hospital laboratories all over the country, including Northern Ireland and parts of Scotland, and then made available to each of these laboratories in return in the form of a confidential weekly summary.

In addition to normal public health work, as above, an increasing number of laboratories are undertaking responsibility for hospital bacteriology under special arrangements.

Field investigations of infectious disease, and field trials of protective agents, including vaccines, are frequently carried out. All laboratories are engaged to some extent in research in addition to routine work.

A special feature of the Service is the investigation of various problems by Working Parties containing a dozen or more members drawn from laboratories in different parts of the country. Some of the problems investigated are of direct concern to Government Departments, with which close working relations have always existed.

General information about the current work of the Service is published in the joint " Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service " which is issued, free of charge, to all medical officers and bacteriologists concerned with epidemiology and public health.

For those who do not receive a free copy, the Monthly Bulletin may be purchased at 1*s.* 6*d.* a copy through the Ministry of Health.

The Service distributes various vaccines and sera on behalf of the Ministry of Health. It also provides certain reagents for diagnostic purposes, prepared by or issued from the Standards Laboratory for Serological Reagents at the Central Public Health Laboratory, Colindale Avenue, London, N.W.9. (*see* p. 19).

GRANTS AND OTHER ASSISTANCE RECEIVED FOR SPECIAL INVESTIGATIONS

In 1962 the Public Health Laboratory Service Board received the following grants to enable special investigations to be undertaken, and major equipment of a special nature to be obtained.

(*a*) From the World Health Organisation:

$5,000 for the assistance of laboratory research on Enteric Phage-typing at the International Centre recognised at the Enteric Reference Laboratory, Colindale, London.

$3,500 for the International Shigella Centre recognised at the Dysentery Reference Laboratory, Colindale, London.

$3,000 for the International Reference Centre for Staphylococcal Phage-typing recognised at the Cross-Infection Reference Laboratory, Colindale, London.

(*b*) From the Medical Research Council:

£4,000 a year, for three years, to enable the undertaking of a collaborative study between general practitioners and laboratories of the Service in certain areas to ascertain the pattern of infection in acute respiratory virus diseases;

£3,200 for the expenses of an investigation of the neurological sequelae of measles, in collaboration with the Medical Officers of Health of 47 of the largest County Boroughs in England and Wales.

Grants have been received by the following individual members of the Board's staff:

(*a*) From the Medical Research Council:

Dr. E. S. Anderson (Director, Enteric Reference Laboratory, Colindale, London).

Provision for special apparatus, and also for scientific and technical assistance, required for a study of the constitution of the cell in *Salmonella paratyphi B* and related organisms.

Dr. L. Hoyle (Director, Public Health Laboratory, Northampton).

Provision for the expenses of an investigation of the physical and chemical structure of influenza virus.

(*b*) From the Wellcome Trust:

Dr. N. S. Mair (Director, Public Health Laboratory, Leicester).

Contribution towards the expenses of a visit to the U.S.A., in order to work at the Children's Hospital of Los Angeles on problems of acute mesenteric lymphadenitis, with special reference to infection with *Pasteurella pseudotuberculosis* and adenovirus.

Dr. S. P. Lapage (Deputy Director, Salmonella Reference Laboratory, Colindale, London).

Contribution towards the expenses of a visit to Denmark, to take part in electron-micrograph studies at the State Serum Institute, Copenhagen, on strains of *Haemophylus vaginalis* isolated by him.

In addition to the provision of research grants described above, two research projects are in progress jointly with the Medical Research Council, in which members of the Council's scientific staff are collaborating. These are as follows:

Research work on viruses at the Epidemiological Research Unit, Cirencester, Gloucestershire;

Various studies at the Cross-Infection Reference Laboratory, Colindale Avenue, London, N.W.9.

Laboratory Directors of the Service are also carrying out investigations in conjunction with general practitioners and hospital medical officers in many places, notably in the study of chronic bronchitis, of hospital cross-infection, and of sterilisation and disinfection problems.

REVIEW BY THE DIRECTOR OF THE SERVICE

LABORATORIES

The extension of the Sheffield laboratory on the first floor of the existing joint laboratory at the City Hospital was opened by Sir George Godber in December, 1961. It provides a much needed increase in accommodation for a busy laboratory that carries out bacteriological, serological and virological work for the hospitals within the Group Management Committee and for the public health authorities over a wide area.

A new joint laboratory for Carmarthen came into use at the West Wales General Hospital, Glangwili, early in 1962. The laboratory is of unusual design in being built on the first floor around the skylight roof of the out-patient department below. Of the rectangle thus formed, the hospital laboratory occupies one-half and the public health laboratory the other. The windows of all rooms are on the outside of the rectangle, and all doors, including the open passage-way from which they are approached, are on the inside. The design, of course, entails the staff in more walking than would the conventional pattern of rooms opening off each side of a middle corridor but, as the laboratory is small, this does not greatly matter.

In last year's report it was mentioned that the closing of the public health laboratory at Aberystwyth had led to trouble. Owing to the difficulty and expense of transporting sanitary specimens to Shrewsbury or Carmarthen, it was decided, after a meeting with representatives of the Regional Hospital Board, the Hospital Management Committee, and the Cardiganshire County Council, to open a small sub-laboratory at the General Hospital. It will be staffed by a technician belonging to the Public Health Laboratory Service supervised by Dr. Morgan, Director of the Carmarthen laboratory. A single-room laboratory is to be constructed and will, it is hoped, be ready for occupation early in 1963.

An increasing amount of hospital bacteriological work is being undertaken by the Service. A bacteriologist attached to the Conway laboratory was seconded in the autumn of 1961 to work practically whole time at the Royal Alexandra Hospital at Rhyl. A small single-storey building was converted for the purpose by the Hospital Management Committee; and most of the bacteriological specimens from the hospital itself and from the numerous other hospitals in the Clwyd and Deeside area are now being examined in the very attractive laboratory that resulted. During the past year the laboratories at Newport, Plymouth and Maidstone have taken over the hospital bacteriological work. The advantages of such an arrangement are that, by saving the Regional Hospital Board the necessity of appointing an extra part-time consultant, it leads to economy in staffing, and by enabling all specimens from patients within and without the hospital to be examined in a single laboratory it provides the bacteriologist with a better epidemiological picture of infections in the area than he would otherwise have.

STAFF

The numerous losses from senior staff in 1961 have not yet been made good, and more—mainly retirements on grounds of age—are expected during 1963.

In addition, Dr. B. P. Marmion, who has been appointed to the Chair of Bacteriology in the new Medical School at Monash, Melbourne, will be leaving to take up his new post. However, recruiting of junior staff has been unusually brisk. During 1962 six trainees were taken on, four Assistant Bacteriologists, and two Assistant Epidemiologists. Of the trainees, two resigned after about six months, one to take a post as bacteriologist in the United States of America, the other to join a large commercial organisation. Other losses during the year were: two trainee bacteriologists, one for domestic reasons and the other on grounds of health; Dr. A. Shaw, to take a post as Deputy Medical Officer of Health to Middlesex County Council; and Dr. W. G. Strawbridge to take a post as Consultant Pathologist at Little Bromwich Hospital.

The sudden death of two technicians who had been with the Service since the emergency days of 1939 is recorded with regret: Mr. A. Mercer of Conway; and Mr. A. J. Hart, who, after working for many years at Aberystwyth, was transferred to Chelmsford to take technical charge of the new laboratory there. Both had given loyal and invaluable service.

VISITS AND VISITORS

The VIII International Congress on Microbiology held in Montreal from 20th to 25th August was attended officially by ten medical and scientific members of the Service. Among them, Dr. S. T. Cowan and Dr. Patricia Bradstreet also attended a meeting of the Permanent Committee of the British Commonwealth Collections of Micro-Organisms Organisation at Ottawa, and Dr. Betty Hobbs a meeting of experts on food standards arranged jointly by the World Health Organisation and the International Association of Microbiologists. Dr. L. Hoyle took part in the Symposium on " Basic Mechanisms in Animal Virus Biology " at Cold Spring Harbor, and Dr. J. C. McDonald and Dr. B. P. Marmion were invited by the National Institutes of Health at Bethesda, U.S.A., to join in a conference on " Newer Respiratory Disease Viruses ". Immediately afterwards Dr. McDonald visited Dr. Langmuir's laboratory at the Communicable Diseases Center, Atlanta, and stayed there for a week.

In addition, the Director of the Service visited Makerere College at Kampala, Uganda, for ten days to advise on bacteriological and virological problems in East Africa; Dr. I. G. Murray, with the support of the Medical Research Council, spent a month studying mycetoma at Khartoum and Wad Medani; and Dr. D. G. Fleck, one of the Service's two experts on the laboratory diagnosis of toxoplasmosis, spent two months in Dr. Leon Jacobs' laboratory at the National Institutes of Health, Bethesda, studying the antigen concerned in haemagglutination. On the invitation of Dr. L. W. Wannamaker, Mr. W. R. Maxted was granted unpaid leave for one year to work on a problem of his own selection in the Department of Paediatrics of the Medical School of the University of Minneapolis. Funds are being provided by the American Heart Association.

During the year 48 visitors from abroad spent periods ranging from 1 week to 12 months in one or other of the departments at Colindale. Of these, 13 stayed for 3 months or longer. Most were postgraduate students supported by W.H.O. or C.E.N.T.O. Fellowships, by the British Council, or by their own governments. Outside London, the following laboratories entertained 9 visitors from India, Burma, West Bengal, Hong Kong, Japan and Ghana for periods of from 3 weeks to 1 year: Leicester, Liverpool, Manchester, Newcastle and Portsmouth.

COMMITTEES

The committee appointed to study the incidence and types of unusual acid-fast bacilli in lung lesions completed its task and prepared a report for publication. The results are referred to later on (p. 12).

A committee was set up late in the year to enquire into the hazards of the various new methods being used to prepare broiler chickens for the market, and into the dangers of the vacuum-packing process in general. Under certain conditions of cooking, anaerobic organisms from the gut and elsewhere are not completely destroyed. Some spores remain alive and are apt to start growing unless the chicken is kept cold. Normally the result is spoilage, but a far more serious potential danger is the growth of *Clostridium botulinum* if it happens to be present. This organism produces the most lethal toxin known to man. At one time it was the bugbear of the canning industry, but the extensive investigations carried out during the twenties in the United States defined the conditions necessary for its destruction and led to changes in processing that have rendered properly canned food one of the safest of all foods to eat. New methods, however, bring new dangers, and public health bacteriologists have to be ever on the watch for results unforeseen by the processors themselves.

The Director was appointed Chairman and Dr. Kelsey Joint Secretary of an advisory group on sterilisation set up by the Ministry of Health to consider sterilisation procedures and the testing of materials for sterility whether subject to control under the Therapeutic Substances Act or not.

SCIENTIFIC WORK

Smallpox.—The outstanding event of the year was the importation of smallpox from Pakistan on five separate occasions during December 1961 and January 1962, leading to the distribution of infected immigrants in London, West Bromwich, Bradford, Birmingham and Cardiff. Secondary cases occurred in three of these areas. In South Wales the disease lingered on and infection was not finally extinguished till the end of April. Altogether there were 62 indigenous cases with 24 deaths. Being responsible on behalf of the Ministry of Health for the distribution of vaccine lymph, the Public Health Laboratory Service was called upon to perform a most difficult task. Normally, strict quarantine measures with vaccination of all contacts is sufficient to control the disease; but on this occasion the public demand, stimulated by the Press, Radio and Television, for mass vaccination, created a most unusual situation. Though there was never any real shortage of vaccine in the country, there were local shortages of single-dose capillary tubes, which could not be filled quickly enough to keep up with the demand. Together with the conflicting policies that were adopted by or forced on different local authorities, this led to a great deal of confusion and recrimination. The Service found itself, as it did with gamma globulin for the prevention of rubella, in the unenviable position of being responsible for the distribution but not the supply of prophylactic material. Whenever the supply failed, the local laboratory came in for blame, even though it was doing its best by a system of priorities to make its tenuous stock last as long as possible.

The outbreak was not without its usefulness. It did draw attention to the need for a uniform policy of epidemic control throughout the country; for a more expeditious method of providing vaccine lymph in containers ready for use; for reconsideration of the practice of infant vaccination; and for a more lively appreciation of the risks and complications of vaccination against smallpox. The exact number of complications occurring in vaccinated persons or in contacts of vaccinated persons cannot be ascertained, but there were at least 113 cases of generalised vaccinia, including eczema vaccinatum and vaccinia gangrenosa, with 9 deaths, and at least 35 cases of post-vaccinal encephalitis with 3 deaths. In addition numerous infections of the eye came to light, characterised by the development of keratoconjunctivitis. A great many of these complications would not have occurred had not the public clamoured for mass vaccination. As it was, in the toil and heat of the moment eczematous persons and others who ought not to have been vaccinated were either vaccinated themselves or exposed to other persons who had been vaccinated, sometimes with disastrous consequences.

The bright side of the story was afforded by the help given to the clinicians by the diagnostic laboratories at Colindale, Leeds, and Cardiff, as well as by Professor Downie at Liverpool. For the first time the agar gel diffusion test was afforded a proper trial. Though not giving a positive reaction in every case, it frequently enabled a diagnosis to be made within 2 to 3 hours instead of the 24 hours required by the complement-fixation test. The virological diagnosis of smallpox is now so reliable that the laboratory is called upon to act as the final arbiter in all the doubtful cases of modified smallpox and chickenpox and vaccinia in which the clinician cannot be completely certain of his judgment. In South Wales, where the greatest difficulties occurred, Dr. Evans at Cardiff examined 243 specimens from suspected cases without, so far as could be ascertained, a single mistake. The laboratories in this way are providing a very real service to the community.

Cross-infection in hospitals.—This problem continues to play a major part in the investigations carried out by the Service. Between 1957 and 1959 a survey was undertaken by a number of laboratories into the incidence of post-operational sepsis in the surgical wards of 21 different hospitals. Altogether about 3,000 patients who had been operated on were studied clinically and bacteriologically during convalescence. No less than 9·7 per cent of the wounds became septic to some extent and yielded pathogenic bacteria on culture. The proportion varied from hospital to hospital, and in the same hospital according to the nature of the operation, the age of the patient, the use of a drainage tube, and other factors. The practical result was reflected in the increased stay in hospital of patients whose wounds became septic; this amounted to an estimated average of one week per patient, and to a cost of an extra 3 million pounds a year.

During the past year a similar study has been carried out to determine the frequency of cross-infection in medical wards. Here infection is acquired not through open wounds but mainly by the respiratory and alimentary tracts. The danger is greatest with infants in maternity wards, where epidemic gastro-enteritis sometimes claims a large number of victims, but is by no means negligible in older patients whose progress towards recovery may be reversed by intercurrent infection. As complementary to this survey, a special enquiry is being directed to ascertain the importance of staphylococcal infection as a cause of death in hospital patients. For this purpose a number of laboratories are making cultures of the tissues of patients coming to autopsy. Already it is clear that in many patients the occurrence of infection has not been recognised during life.

It must not be thought that attention is being devoted solely to the incidence of cross-infection. Several studies are in progress into the various factors contributing to the development of sepsis and to the ways in which they can be controlled. The problems, however, are very complex and will take a long time to solve. Nevertheless an advance is being made, and in some hospitals where rigid measures have been introduced and enforced a welcome decline in the incidence of these difficulties has been observed.

The Eaton agent of atypical pneumonia.—One of the most interesting pieces of research was carried out by Dr. B. P. Marmion and Miss G. M. Goodburn at Leeds into the nature of Eaton's primary atypical pneumonia organism. At the end of the second world war Eaton, Meiklejohn and van Herick in the United States isolated, from the sputa or lungs of cases of " atypical pneumonia " with cold haemagglutinins, a filtrable agent which resembled in some respects the psittacosis–LGV group of viruses or the rickettsiae. This agent grew in the lungs of chick embryos after inoculation by the amniotic route. At first its presence there could be detected only by the ability of the lung suspensions to cause pneumonia on sub-inoculation into hamsters or cotton-rats. In the early fifties Liu and Eaton in Boston demonstrated its presence directly in chick embryo lung by immunofluorescence, using convalescent sera from patients with atypical pneumonia.

The nature of the organism remained, however, in doubt. Marmion and Goodburn, noting the size of the organism (180–250mμ by filtration), its resistance to penicillin and sulphonamides, its sensitivity to tetracyclines, and the character of the pneumonia in hamsters, concluded that it might be a member of the pleuropneumonia or *Mycoplasma* group—the smallest known organisms able to multiply in cell-free media and lying between bacteria on the one hand and viruses on the other. Pursuing this idea they showed, by use of a special intensified Giemsa staining method, that infected chick embryo lung contained coccobacillary bodies, closely resembling those formed by mycoplasmae, and located on the bronchiolar epithelium in the same position as the specific antigen of Eaton's agent demonstrable by immunofluorescence. They also showed that the agent was sensitive to ether, to the antibiotic kanamycin, and, in particular, to an organic gold salt—a curious property of the mycoplasmae not shared by the rickettsiae, psittacosis–LGV, vaccinia or other viruses.

Attempts to grow the organism in cell-free media and to show that it produced colonies typical of the pleuropneumonia group were inconclusive in Leeds. However Hayflick at the Wistar Institute (Philadelphia), working in collaboration with Chanock and Barile at Bethesda, did succeed, with difficulty, in establishing a pleuropneumonia organism on artificial media, starting from one of the laboratory strains of Eaton's agent propagated in tissue culture. The American workers also showed that the new isolate was antigenically related to strains of Eaton's agent carried in chick embryos but not to various mycoplasmae from human, animal or avian sources or from contaminated tissue cultures. In

1962 Marmion and Hers (Leeds and Leiden) confirmed this work by isolating and identifying mycoplasmae from two classical strains of Eaton's agent and from several recent isolates from Dutch patients with atypical pneumonia.

These findings are of particular interest because this form of atypical pneumonia is the first human disease for which organisms of the *Mycoplasma* group have clearly been shown to be responsible. They should stimulate a search for mycoplasmae in other apparently infective diseases whose aetiology is uncertain.

The Enterovirus Survey.—This survey came to an end in the middle of the year, but the final identification of the viruses isolated is not yet complete. The analysis of the results will take some months, and a report is unlikely to be ready before June 1963. During the last 3 or 4 months of the survey the picture was complicated by the use of oral living attenuated poliomyelitis vaccine which was made available by the Ministry of Health in April. Many more strains of poliovirus were cultivated from the stools than before, but it was impossible to say how many were wild strains and how many were derived from the vaccine.

The Respiratory Virus Survey.—A survey of acute respiratory infections due to viruses started in October. About 30 laboratories are taking part in it. Dr. Tyrrell of the Common Cold Research Unit at Salisbury very kindly provided courses of instruction in the technique to be used which were attended by the virological workers concerned. The survey is being restricted to children of 0 to 16 years of age. Human embryo kidney cells that are required for cultivation of the rhinoviruses may not be easy to obtain everywhere, but the strain of diploid cells from the human embryo lung developed by Dr. Hayflick at the Wistar Institute, Philadelphia, may prove suitable instead. At Cambridge human embryo cultures are being maintained in a liquid nitrogen apparatus so as to be available whenever virus material is submitted for examination.

Unusual Acid-fast Bacilli in Lung Lesions.—A Committee appointed to study the incidence of acid-fast bacilli resembling tubercle bacilli in lung lesions completed its task and prepared a report. A series of 2,916 strains of acid-fast bacilli were cultivated, mostly from new patients. Among these were 71 so-called anonymous strains, of which 40, or 1·4 per cent. of the whole series, appeared to be responsible for the disease from which they were isolated. As tuberculosis is being brought more and more under control, these anonymous bacilli, which are resistant to many of the anti-tuberculosis drugs, are becoming more prominent.

Tubercle Bacilli in Experimentally Infected Guinea-Pigs.—Another Committee set up to study the excretion of tubercle bacilli by experimentally infected guinea-pigs likewise finished its work. Cage droppings and urine from the bladder were examined in 588 tuberculous guinea-pigs, about half of which had been injected with routine specimens of milk, pleural fluid and other materials, and half with pure cultures of bacilli for virulence tests.

Excretion occurred more frequently in the second than in the first group. Taking both together, tubercle bacilli were recovered from the cage droppings in 30·2 per cent. and from urine in 8·6 per cent. of the animals when these were killed after 6 weeks. This investigation revealed a danger that had been hitherto unsuspected. The Committee made recommendations to lessen the risk of infection of workers in the animal house.

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A. J. Zuckerman, M.B. (*to Guy's Hospital, London, S.E.1.*)

REFERENCE EXPERTS

In the following list the name of the expert who is responsible for the relevant examination is given. It should be added, however, that all regional and most area laboratories are undertaking the routine diagnosis of virus infections, and that several laboratories are undertaking the serological identification of members of the *Salmonella* group, the serological diagnosis of leptospiral infections, and the bacteriophage-typing of strains of *Staphylococcus aureus*.

For this reason, enquiries on these subjects should usually be addressed to the local public health laboratory.

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Brucella, identification

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Clostridium welchii, serological typing

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Coxsackie A viruses

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Enteric Fever

(*a*) Serological investigation of suspected cases and carriers.

(*b*) Phage-type determination of strains of typhoid and paratyphoid bacilli, and of *Salmonella typhi-murium* and other salmonella serotypes.

E. S. Anderson, M.D., Dip. Bact., Enteric Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Enteritis, infantile, typing of strains of *Esch. coli*

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Miss B. C. Hobbs, D.Sc., Dip. Bact., F.R.S.H., Food Hygiene Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Fungi (*pathogenic*), identification

I. G. Murray, M.B., D.T.M. & H., Mycological Reference Laboratory, London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1. *Tel.:* Museum 3041.

Helminthological specimens, investigation

Professor J. J. C. Buckley, D.Sc., London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1. *Tel.:* Museum 3041.

Hydatid disease, complement-fixation test for

Mrs. C. M. P. Bradstreet, M.B., Dip. Bact., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Influenza

L. Hoyle, M.B., Public Health Laboratory, General Hospital, Northampton. *Tel.:* Northampton 34347.

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* Owing to the perishable nature of most foodstuffs, material for investigation from outbreaks of food poisoning should normally be sent to the nearest public health laboratory. The reference laboratory should be used mainly for non-perishable articles of food, especially when litigation may arise, and for the identification of strains.

Leptospiral infections, agglutination tests

L. H. Turner, M.B.E., M.D., D.T.M. & H., Wellcome Laboratories of Tropical Medicine, 183, Euston Road, London, N.W.1. *Tel.:* Euston 4688.

Lymphocytic meningitis
Lymphogranuloma venereum

A. D. Macrae, M.D., Dip. Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Meningococci, typing

Mrs. C. M. P. Bradstreet, M.B., Dip. Bact., Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Parasitic infections, serological diagnosis of

D. S. Ridley, B.Sc., M.D., Department of Pathology, Hospital for Tropical Diseases, 4, St. Pancras Way, London, N.W.1. *Tel.:* Euston 6441.

Plague, investigation

R. J. Henderson, M.D., Public Health Laboratory, Royal Infirmary, Worcester. *Tel.:* Worcester 25238/9.

Pneumococci, typing of from epidemics

M. T. Parker, M.D., Dip. Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Poliomyelitis

A. D. Macrae, M.D., Dip.Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Protozoological specimens, investigation

Professor P. C. C. Garnham, M.D., D.Sc., London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1. *Tel.:* Museum 3041.

Psittacosis, diagnosis

A. D. Macrae, M.D., Dip. Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Rabies, laboratory tests for diagnosis

Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Salmonella organisms, typing

Mrs. J. Taylor, M.B., B.Sc., D.P.H., Salmonella Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Smallpox, laboratory tests for diagnosis

Professor A. W. Downie, M.D., D.Sc., F.R.S., Bacteriology Department, Medical School, Ashton Street, Liverpool, 3. *Tel.:* Royal 7983 and Royal 6022, Ext. 202.

A. D. Macrae, M.D., Dip. Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Professor Scott Thomson, M.D., F.R.C.P.E., D.P.H., Public Health Laboratory, Institute of Pathology, 3rd Floor, Royal Infirmary, Cardiff. *Tel.:* Cardiff 24385.

Staphylococci, bacteriophage-typing

M. T. Parker, M.D., Dip. Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Streptococci of Group A, typing

M. T. Parker, M.D., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Regional Typing Laboratories

(i) *Northern and South Eastern counties:* Cumberland, Co. Durham, Lancs., Northumberland, Westmorland, Yorks.; Dorset, Hants., Kent, London, Middx., Surrey, Sussex.

M. T. Parker, M.D., Dip.Bact., Cross-Infection Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

(ii) *Eastern counties:* Beds., Cambs., Derby, Essex, Herts., Hunts., Leics., Lincs., Norfolk, Northants., Notts., Rutland, Suffolk.

Miss J. M. Boissard, M.R.C.S., Public Health Laboratory, Tennis Court Road, Cambridge. *Tel.:* Cambridge 55526.

(iii) *Western counties:* Berks, Bucks., Cheshire, Cornwall, Devon, Glos., Heref., Oxon., Salop., Somerset, Staffs, Warw., Wilts., Worcs.

R. L. Vollum, D.Phil., Public Health Laboratory, Radcliffe Infirmary, Oxford. *Tel.:* Oxford 49231/2.

(iv) *Wales.*

Professor Scott Thomson, M.D., F.R.C.P.E., D.P.H., Public Health Laboratory, Institute of Pathology, 3rd Floor, Royal Infirmary, Cardiff. *Tel.:* Cardiff 24385.

Toxoplasmosis

North

G. B. Ludlam, M.D., D.T.M. & H., D.L.O., Public Health Laboratory, Bridle Path, York Road, Leeds, 15. *Tel.:* Leeds 645011.

South

D. G. Fleck, M.D., Dip. Bact., Public Health Laboratory, Cockett Road, Swansea. *Tel.:* Swansea 24041/2.

Trichinosis, examination of rats and pigs

Professor J. J. C. Buckley, D.Sc., London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1. *Tel.:* Museum 3041.

Tubercle bacilli, typing

J. Marks, M.D., M.R.C.P., Dip. Bact., Tuberculosis Reference Laboratory, Institute of Preventive Medicine, The Parade, Cardiff. *Tel.:* Cardiff 30108.

Typhus Fever, serological tests*

Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

Venereal diseases

A. E. Wilkinson, M.R.C.S., Venereal Diseases Reference Laboratory, London Hospital Research Laboratories, Ashfield Street, London, E.1. *Tel.:* Stepney Green 3008.

Venereal diseases, Treponemal immobilisation test

A. E. Wilkinson, M.R.C.S., Venereal Diseases Reference Laboratory, London Hospital Research Laboratories, Ashfield Street, London, E.1. *Tel.:* Stepney Green 3008.

Midlands

P. J. L. Sequeira, M.B., The Central Serological Laboratory, Withington Hospital, West Didsbury, Manchester, 20. *Tel.:* Didsbury 8111.

North

J. H. Hale, O.B.E., M.D., M.R.C.P., Public Health Laboratory, Institute of Pathology, General Hospital, Westgate Road, Newcastle upon Tyne, 4. *Tel.:* Newcastle 38811, Ext. 297.

Viruses, material from infections other than those mentioned

A. D. Macrae, M.D., Dip. Bact., Virus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, N.W.9. *Tel.:* Colindale 7041.

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* The Weil-Felix test can be carried out in all constituent laboratories of the Service, and also in a number of hospital laboratories. Only sera giving a doubtful reaction should be sent to the Virus Reference Laboratory.

VACCINES AND SERA OBTAINABLE THROUGH THE PUBLIC HEALTH LABORATORY SERVICE

(These reagents are issued free of charge to medical officers of health and to general practitioners taking part in Local Health Authorities' arrangements made under Section 26 of the National Health Service Act)

Laboratory (For address see pp. 13–17)	Smallpox *Vaccine	Typhus Vaccine	Rabies Vaccine
Birmingham	+	+	—
Bristol	+	+	—
Cambridge	+	+	—
Carlisle	+	—	—
Derby	+	—	—
Dorchester	+	—	—
Exeter	+	+	—
Hereford	+	—	—
Ipswich	+	—	—
Leeds	+	+	—
Leicester	+	—	—
Lincoln	+	—	—
Liverpool	+	+	+
London (Colindale)	+	+	+
Maidstone	+	—	—
Manchester	+	+	—
Newcastle	+	+	+
Northallerton	+	—	—
Northampton	+	—	—
Norwich	+	—	—
Oxford	+	+	—
Preston	+	—	—
Sheffield	+	+	—
Stafford	+	—	—
Wakefield	+	—	—
Winchester	+	—	—
Cardiff (*a*)	+	+	+
Carmarthen	+	—	—
Conway	+	—	—

+means that a stock is normally held. —means that a stock is not normally held.

NOTE 1.—Antisera for *therapeutic* use are obtainable through the Hospital Pathological Service.

„ 2.—*Gamma globulin* prepared from the pooled plasma of normal healthy adults is obtainable on request from any laboratory of the Service. So far as supplies allow, it is issued for the protection of susceptible contacts of measles, rubella, infectious hepatitis and poliomyelitis.

In addition to normal gamma globulin, a stock of gamma globulin prepared from the blood of persons recently vaccinated against smallpox is held for the treatment of cases of generalised vaccinia, eczema vaccinatum, accidental vaccinial infections endangering the eye, and, in special circumstances, for the protection of unvaccinated smallpox contacts. This anti-vaccinial gamma globulin may be obtained from any of the regional laboratories (pp. 13–14) and from Birmingham (p. 14) as well as from Colindale.

„ 3.—*Yellow fever:* A list of centres where inoculation against this disease can be carried out is obtainable from the Ministry of Health, Alexander Fleming House, Elephant & Castle, London, S.E.1.

„ 4.—*T.A.B.C., cholera, and most other vaccines* are available commercially.

„ 5.—*Material for intradermal diagnostic tests:* Frei antigen for Lymphogranuloma inguinale, Brucellin for Undulant fever, Trichina antigen for Trichinosis, Hydatid antigen for Hydatid disease, and cat-scratch fever antigen can be obtained from

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* In addition to the laboratories named officially below, many laboratories carry small supplies for the convenience of local medical practitioners.

NOTE 5.—*contd.*

Dr. C. M. Patricia Bradstreet, Standards Laboratory for Serological Reagents, Central Public Health Laboratory, Colindale Avenue, London N.W.9. (*Tel.* Colindale 7041). Kveim antigen for Sarcoidosis may also be obtained, through any pathologist, from the Standards Laboratory. Histoplasmin, coccidioidin and blastomycosis antigen for diagnostic skin tests may be obtained from the Department of Pathology, St. John's Hospital for Diseases of the Skin, Lisle Street, London, W.C.2. (*Tel:* Gerrard 8383, Ext. 22).

,, 6.—Certain *reagents for the diagnosis of venereal disease* can be obtained from Dr. A. E. Wilkinson at the Venereal Diseases Reference Laboratory, London Hospital Research Laboratories, Ashfield Street, London, E.1. (*Tel:* Stepney Green 3008).

APPENDIX I

PRINCIPAL COMMITTEES AND WORKING PARTIES

Food Investigation

J. H. McCoy, M.B., D.P.H. (*Chairman*)
N. S. Galbraith, M.B., D.P.H. (*Secretary*)

E. S. Anderson, M.D., Dip. Bact.
R. W. S. Harvey, M.B., Dip. Bact.
Miss B. C. Hobbs, D.Sc., Dip. Bact., F.R.S.H.
W. Kwantes, M.B., Dip. Bact.
H. D. S. Morgan, M.R.C.S., Dip. Bact.
R. Norton, M.B., D.P.H.
Professor D. T. Robinson, M.Sc., M.R.C.S., Dip. Bact.
H. G. M. Smith, M.B., Ph.D., Dip. Bact.
Mrs. J. Taylor, M.B., B.Sc., D.P.H.
A. J. H. Tomlinson, M.D.
M. Ingram, M.A., Ph.D. (*Low Temperature Research Station*)
J. Greenwood Wilson, M.D., D.P.H., F.R.C.P. (*M.O.H., Port and City of London*)
S. Brightwell, M.Sc., D.I.C., A.R.I.C. (*Messrs. J. Sainsbury, Ltd., to give technical advice on trade matters*)

Salmonella Infections from Home-Produced Meat

H. G. M. Smith, M.B., Ph.D., Dip. Bact. (*Chairman*)
J. M. S. Dixon, M.D., Dip. Bact. (*Secretary*)

E. S. Anderson, M.D., Dip. Bact.
G. T. Cook, M.D.
D. G. Davies, M.D. Dip. Bact.
N. S. Galbraith, M.B., D.P.H.
R. W. S. Harvey, M.B., Dip. Bact.
R. J. Henderson, M.D.
Miss B. C. Hobbs, D.Sc., Dip. Bact., F.R.S.H.
M. H. Hughes, D.M., D.T.M. & H., Dip. Bact.
C. H. Jellard, B.M., Dip. Bact.
G. J. G. King, M.B., Dip. Bact.
W. F. Lane, M.B., M.Sc., D.P.H.
G. B. Ludlam, M.D., D.T.M. & H., D.L.O.
J. H. McCoy, M.B., D.P.H.
D. J. H. Payne, M.B., Dip. Bact.
L. Robertson, B.M., Dip. Bact.
J. A. Rycroft, M.B., Dip. Bact.
A. J. Kingsley Smith, B.M.
Mrs. J. Taylor, M.B., B.Sc., D.P.H.
G. H. Tee, Ph.D., M.R.C.S.
P. J. Wormald, M.D.

Cross-Infection in Hospitals

(*a*) *Autopsy Survey of Staphylococcal Infection* (*Steering Committee*)

M. T. Parker, M.D., Dip. Bact. (*Chairman*)
B. Moore, M.D., B.Sc. (*Secretary*)

H. R. Cayton, M.B.
R. J. Henderson, M.D.
K. E. A. Hughes, M.B.E., M.R.C.S.
J. C. McDonald, M.D., D.P.H., D.I.H.
Professor R. E. O. Williams, M.D., M.R.C.P. (*St. Mary's Hospital Medical School*)

(*b*) *Survey of Hospital-Acquired Infection in Medical Wards* (*Steering Committee*)

M. T. Parker, M.D., Dip. Bact. (*Chairman*)
A. R. Blowers, M.D., Dip. Bact. (*Secretary*)

J. A. Boycott, D.M.
N. S. Galbraith, M.B., D.P.H.
R. J. Henderson, M.D.
H. D. S. Morgan, M.R.C.S., Dip. Bact.

In addition to the members of the Steering Committees, a number of laboratories are taking part in one or other or both surveys.

Problems Relating to the Testing and Evaluation of Disinfectants

Sir Graham Wilson, M.D., F.R.C.P., D.P.H. LL.D. (*Chairman*)
J. C. Kelsey, M.D., Dip. Bact. (*Secretary*)

R. J. Henderson, M.D.
A. H. Tomlinson, D.Phil.
A. M. Cook, Ph.D., F.P.S., F.R.I.C. (*School of Pharmacy, University of London*)
H. Davis, C.B.E., Ph.D., F.P.S., F.R.I.C. (*Chief Pharmacist, Ministry of Health*)
Professor L. P. Garrod, M.D., F.R.C.P.
G. Sykes, M.Sc., F.R.I.C. (*Chief Bacteriologist to Messrs. Boots*)

Bacteriological Examination of Watercress

G. H. Tee, Ph.D., M.R.C.S. (*Chairman*)
A. L. Furniss, M.D., Dip. Bact. (*Secretary*)

G. T. Cook, M.D.
J. M. Croll, M.B., D.P.H.
Miss B. C. Hobbs, D.Sc., Dip. Bact., F.R.S.H.
H. D. Holt, M.R.C.S., D.P.H., Dip. Bact.
K. E. A. Hughes, M.B.E., M.R.C.S.
W. H. H. Jebb, M.D., Barrister-at-Law.
G. J. G. King, M.B., Dip. Bact.
B. R. Sandiford, M.D.
J. F. E. Bloss, M.R.C.S., D.P.H. (*Ministry of Health*)
C. A. Scarlett, B.Sc., F.R.I.C. (*Ministry of Agriculture, Fisheries and Food*)
A. F. Gardner, Dip. Hort. (*Wye*) (*Ministry of Agriculture, Fisheries and Food*)
J. Jesty (*Messrs. Bedford and Jesty, Ltd., to give technical advice on trade matters*)

Working Party on Epidemic Non-Bacterial Gastro-Enteritis

B. Moore, M.D., B.Sc. (*Chairman*)
Miss S. K. R. Clarke, M.D. (*Secretary*)

G. T. Cook, M.D.
M. H. Hughes, D.M., D.T.M. & H., Dip. Bact.
J. E. Jameson, M.R.C.S.
A. D. Macrae, M.D., Dip. Bact.
D. L. Miller, M.B.
T. D. F. Money, M.B., D.R.C.O.G.
L. Robertson, B.M., Dip. Bact.
J. O'H. Tobin, B.M., Dip. Bact.
J. E. M. Whitehead, M.B., Dip. Bact.
N. Wood, M.D., B.Sc.
P. Henderson, M.D., D.P.H. (*Ministry of Education*)
A. T. Roden, M.D., D.P.H. (*Ministry of Health*)

Working Party on the Potential Growth and Toxin Production of Clostridium botulinum in Processed Foods (see p. 9)

J. H. McCoy, M.B., D.P.H. (*Chairman*)
J. M. S. Dixon, M.D., Dip. Bact. (*Secretary*)

J. D. Abbott, M.D., Dip. Bact.
H. R. Cayton, M.B.
Miss B. C. Hobbs, D.Sc., Dip. Bact., F.R.S.H.
Miss Irene Hutchinson, M.D., D.P.H., D.T.M.
L. A. Little, M.B., Dip. Bact.
P. G. Mann, M.D., Dip. Bact.
D. J. H. Payne, M.B., Dip. Bact.
Miss H. E. Ross, B.Sc.
Mrs. J. A. Spooner, B.Sc.
A. J. H. Tomlinson, M.D.
R. B. Little, B.Sc.(Agric.), N.D.A. (*The British Oil and Cake Mills, to give technical advice on trade matters*)
P. R. Riley, B.Sc., A.R.I.C. (*Messrs. Spillers, Ltd., to give technical advice on trade matters*)

Joint Veterinary and Public Health Laboratory Services Working Party on Salmonellosis

Veterinary Service

D. W. Menzies, M.R.C.V.S. (*Chairman*)
D. R. Allen, M.R.C.V.S.
N. H. Brooksbank, B.Sc., M.R.C.V.S.
H. I. Field, M.Sc., M.R.C.V.S.
I. H. Fincham, M.R.C.V.S.
E. A. Gibson, Ph.D., B.Sc.(Vet.), M.R.C.V.S.
G. B. S. Heath, B.Sc. (Edin.), F.R.C.V.S.
R. M. Loosmore, B.V.Sc., M.R.C.V.S.
W. B. V. Sinclair, M.R.C.V.S.
W. J. Sojka, M.R.C.V.S.
J. A. J. Ven, M.R.C.V.S., D.V.S.M. (Vict.)

P.H.L.S.

R. W. S. Harvey, M.B., Dip. Bact. (*Secretary*)
E. S. Anderson, M.D., Dip. Bact.
J. A. Boycott, D.M.
D. G. Davies, M.D., Dip. Bact.
N. S. Galbraith, M.B., D.P.H.
Miss B. C. Hobbs, D.Sc., Dip. Bact., F.R.S.H.
G. B. Ludlam, M.D., D.T.M. & H., D.L.O.
J. H. McCoy, M.B., D.P.H.
B. Moore, M.D., B.Sc.
Miss P. M. Poole, M.D., Dip. Bact.
Mrs. J. Taylor, M.B., B.Sc., D.P.H.
P. J. Wormald, M.D.

APPENDIX II

PUBLICATIONS BY MEMBERS OF THE STAFF OF THE PUBLIC HEALTH LABORATORY SERVICE DURING 1962

ANDERSON, E. S.

Report of the International Reference Laboratory for Enteric Phage-typing, 1953–1958. *Ann. Inst. Pasteur*, 1962, **102,** 379.

The genetic basis of bacteriophage typing. *Brit. med. Bull.*, 1962, **18,** 64.

AROUFF, L. A.

The isolation of *Haemophilus* species from sputum. *Mon. Bull. Minist. Hlth. Lab. Serv.*, 1962, **21,** 119.

BARROW, G. I.

On the bacteriology of impetigo contagiosa, with some observations on microbial antagonism by impetigo staphylococci. *University of Glasgow, M.D. Thesis*, 1962.

BARROW, G. I. and ELLIS, C.

Colicine typing of *Shigella sonnei* by replicate multiple-slide inoculation of indicator organisms. *Mon. Bull. Minist. Hlth. Lab. Serv.*, 1962, **21,** 141.

BASSETT, D. C. J.

The cytotoxic action of Forssman antisera on guinea-pig kidney cells *in vitro*, and the localization of the antigen within the cells. *Brit. J. exp. Path.*, 1962, **43,** 409.

BEARE, A. S.

Neutralization and haemagglutination-inhibition tests in a live influenza vaccine trial. *Mon. Bull. Minist. Hlth. Lab. Serv.*, 1962, **21,** 167.

BENNETT, H. H. W. and KELSEY, J. C.

Central sterile supply. (Letter.) *Brit. med. J.*, 1962, ii, 1191.

BLOWERS, R., LIDWELL, O. M. and WILLIAMS, R. E. O.

Infection in operating theatres in relation to air conditioning equipment. *J. Instn. Heat. Vent. Engrs.*, 1962, **30,** 244.

BLOWERS, R. and PUCKRIN, J.

Disposable bedpans: a study of a possible bacteriological hazard. *Mon. Bull. Minist. Hlth. Lab. Serv.*, 1962, **21,** 235.

BOYCOTT, J. A.

Salmonella species in turtles. *Science*, 1962, **137,** 761.

BRADSTREET, C. M. Patricia

Problems associated with the estimation of potency of a neutralizing serum for the typing of viruses. *Proc. VII int. Congr. biol. Standardization*, London, 1961, p. 161.

BRADSTREET, C. M. Patricia and TAYLOR, C. E. D.

Technique of complement-fixation test applicable to the diagnosis of virus diseases. *Mon. Bull. Minist. Hlth. Lab. Serv.*, 1962, **21,** 96.

BRUNO-LOBO, G., PEREIRA, M. S. and PEREIRA, H. G.

Estudos sobre adenoviroses no Rio de Janeiro. *An. Microbiol., Rio de J.*, 1961, **9c,** 567.

BUTLER, N., SKELTON, M. O., HODGES, G. M. and MACCALLUM, F. O.

Fatal Coxsackie B_3 myocarditis in a newborn infant. *Brit. med. J.*, 1962, i, 1251.

COCKBURN, W. C.

Field investigations in relation to standardization with special reference to typhoid vaccination. *Proc. VII int. Congr. biol. Standardization*, London, 1961, p. 441.

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Salmonella isolated at Ibadan. (Fourth report: strains isolated during 1959.) *W. Afr. med. J.*, 1962, **11,** 77.

Collee, J. G., Knowlden, J. A. and Hobbs, B. C.
Studies on the growth, sporulation and carriage of *Clostridium welchii* with special reference to food poisoning strains. *J. appl. Bact.*, 1961, **24,** 326.

Collins, C. H.
The investigation of bacterial food poisoning and the bacteriological examination of food. In: *Progress in medical laboratory technique.* 1. Edited by F. J. Baker. London, Butterworths, 1962, p. 54.

The classification of " anonymous " acid-fast bacilli from human sources. *Tubercle, Lond.*, 1962, **43,** 292.

Cook, G. T. and Smith, A. J.
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An introduction to chaos, or the classification of micrococci and staphylococci. *J. appl. Bact.*, 1962, **25,** 324.
The microbial species—a macromyth? *Symp. Soc. gen. Microbiol.*, 1962, No. 12. Edited by G. C. Ainsworth and P. H. A. Sneath. p. 433.

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A transplantable tumour of the mouse that is virus-susceptible in tissue culture. *J. Path. Bact.*, 1962, **83,** 564.

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Isolation and identification of enteric organisms. In: *Progress in medical laboratory technique.* 1. Edited by F. J. Baker. London, Butterworths, 1962, p. 78.

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A comparison between aspirin and antibiotics in the treatment of minor respiratory infections. *Lancet*, 1962, i, 614.

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An outbreak of human salmonellosis due to *Salmonella saint-paul* associated with infection in poultry. *Mon. Bull. Minist. Hlth. Lab. Serv.*, 1962, **21,** 209.

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Gillespie, E. H.
The bacteriological examination of ice-cream. *Sanitarian, Lond.*, 1962, **71,** 139.

Goodburn, Gillian M. and Marmion, B. P.
A study of the properties of Eaton's primary atypical pneumonia organism. *J. gen. Microbiol.*, 1962, **29,** 271.

Investigations of the nature of Eaton's primary atypical pneumonia organism. *J. Hyg. Epidem., Prague*, 1962, **6,** 176.

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Mercury sensitivity of staphylococci. *J. clin. Path.*, 1962, **15,** 249.

Hale, J. H.

Duration of immunity in virus diseases. *Advanc. Immunol.*, 1961, **1**, 263.

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